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ABSTRACT

Designed to facilitate the transition of students in transportation career education from the secondary to the postsecondary level, this guide, which is part of a series on career education in transportation, deals with the problem of the lack of communication between the two levels necessary for a unified, comprehensive career education system. In its first sections it provides secondary school teachers and counselors, as well as postsecondary school faculty and admissions officers, with background information on transportation. The various types of transportation (land, water, air, and pipeline) are defined, and some major problems with the transportation industry are identified (e.g., the energy crisis). The next section discusses transportation career education (for intermodal transportation careers which combine job elements from several types of transportation) and reviews the work of the Transportation Curriculum Project (TCP), which has produced instructional materials covering grade 6 to postsecondary training. Finally, the guide lists sources of information to which the student can be directed for further career education. Recommendations to solve the articulation problem stress the importance of a formal organization, composed of secondary and postsecondary schools and the transportation industry, whose purpose is to achieve an integrated educational plan and to insure that the student acquires specific job skills. (ELG)

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AN ARTICULATION GUIDE

FOR

INTERMODAL TRANSPORTATION CAREER EDUCATION

by

Wallace R. Maples, Ed.D.

and

Charles W. Babb, Ed.D.

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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TABLE OF CONTENTS

	Page
PREFACE	iv
FOREWORD	v
PROBLEMS IN ARTICULATION	1
THE TRANSPORTATION INDUSTRY: DEFINITIONS AND PROBLEMS	2
Transportation Definitions	2
Problems Within the Transportation Industry	4
THE TRANSPORTATION CURRICULUM PROJECT	5
OPPORTUNITIES FOR THE TRANSPORTATION STUDENT IN POST-SECONDARY EDUCATION	8
Transportation Related Programs in Post-Secondary Institutions	8
Proprietary Schools	9
Correspondence Schools	13
TRANSPORTATION DATA SOURCE	14
SUMMARY AND PROBLEM SOLUTIONS	15
BIBLIOGRAPHY	18
APPENDIX	19

PREFACE

Any analysis of education in general reveals a rigidity of curricular offerings that fails to recognize and effectively deal with the individual differences of learners. This problem has been compounded by the lack of articulation between instructional programs offered in secondary schools and those offered in post-secondary education. The problem exists, no matter what the curricular area, and career education is no exception.

Recent emphasis on competency-based education has caused educational leaders to recognize this problem and make some efforts toward its elimination, or at least toward significantly reducing it as a problem. Competency-based education implies that the end is of primary importance and that education exists for the expressed purpose of assisting students to perform at a predetermined proficiency level.

If the end is truly of primary importance, then why should the graduate of a secondary school data processing program be automatically placed in a basic data processing course when beginning a post-secondary program in Traffic & Transportation Management? Or why should a student enrolled in a post-secondary Automotive Technican program be assigned to a basic auto mechanics course after graduating from a 2-year secondary auto mechanics program? In effect, the student is *required* to endure a series of educational experiences designed to develop previously acquired skills, and redundancy and duplication of effort prevail. In these and similar situations the means are, in reality, being placed higher in priority than the end, and competency-based education is not being served.

Research conducted throughout the course of the Transportation Curriculum Project indicates that approximately sixty percent of all jobs in transportation require education beyond the high school level but at less than the baccalaureate degree level. Programs of preparation for careers in transportation at this level, both existing and projected, are not adequate to meet present and future needs. Additionally, programs in career exploration at the post-secondary level, for those who have not been exposed to it in high school, are practically non-existent.

This paper is the result of the Transportation Curriculum Project's efforts to alleviate articulation problems in transportation career education. It is, by design, a guide to be used by secondary and post-secondary educators and supplemented by transportation industry requirements. Attempts have been made in compiling this guide to anticipate the needs and problems of secondary and post-secondary faculty, counselors, admissions officers and administrators in facilitating the movement of students from secondary to post-secondary transportation career programs. Success will depend upon these people doing their jobs and will be measured by success of the students choosing to pursue careers in transportation.

Edwin T. Petrie
Project Director

FOREWORD

The educational world is constantly faced with articulation problems which prevent the smooth and orderly flow of students from one level of education to another or among programs at the same educational level. Career education programs, more especially transportation career programs, are no less beset articulation problems than is general education.

The purpose of this guide is to facilitate the transition of students in transportation career education programs from the secondary to the post-secondary education level. Its specific target audience is secondary education teachers and counselors as well as post-secondary faculty and admissions officers. These persons, more than any others can obviate many articulation problems and work through those problems already existing. The guide provides the counselor with some background on transportation careers and lists sources of information to which the student can be guided for further career exploration. The Transportation Curriculum Project (TCP) is posited in the guide as a model for future development of transportation career education in the pbulic schools. The TCP has been the only major transportation curriculum effort funded by the U. S. Office of Education or the U. S. Department of Transportation.

The authors express appreciation to the various agencies and persons who contributed to the development of this guide. Special appreciation is due to Dr. Michael Schukert for the material he compiled regarding degree and non-degree programs in transportation in the United States, to Dr. Pauline Maupin for her contribution and to H. Miller Lanier for his constant guidance during the process of developing the guide. Appreciation is also expressed to Diane Winfrey and Lee Polk.

Wallace R. Maples, Ed.D.
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PROBLEMS IN ARTICULATION

The purpose of this guide is to ease the transition of students as they progress from transportation career education programs at the secondary level to those at the post-secondary level. The purpose, admittedly, is an ambitious one and it assumes that the reluctance of diverse education units to communicate will be recognized as a major impediment to improved coordination. While the guide will provide some limited information designed to aid the development of transportation career education curricula, it also recognizes that the student's transition from one educational level to another is hampered by the aforementioned lack of the communication necessary to developing a unified, comprehensive career education system which focuses its entire efforts on the student as an individual. Goldhammer and Taylor recently commented that primary attention within the educational system has been the maintenance of the system itself rather than the student as a client or one who receives service (Goldhammer & Taylor, 1972). Articulation, then, is a central problem.

The topic of articulation is well known in American education. The problem, however, is international in scope. Reviews of the professional literature of other countries reveal an on-going effort to overcome barriers to an educational continuum. The problem relates to the fragmented educational structure as well as to the historic separation of academic and occupational education. The bulk of the literature dealing with articulation has been addressed to the need for continuity between lower and upper division post-secondary academic programs (Bender, 1973). Virtually no attention has been given to articulation of transportation education within the educational system, and even less to transportation *career* education. From research findings, it seems apparent that a need exists to articulate K-12 career education programs upward to post-secondary institutions, i.e., vocational schools, technical institutes, community colleges, universities and colleges, proprietary schools and other institutions of higher education. Within the transportation careers area, new kinds of investigations and planning will be necessary if students are to make sensible, effective and timely transitions.

Research from the Transportation Curriculum Project (TCP) has indicated a need for transportation curricula at the post-secondary education level. TCP research shows 60% of all jobs in transportation require education beyond the high school level but at less than the baccalaureate degree level, while another 10% require the baccalaureate. Programs to prepare people for careers in transportation at these levels, both existing and projected, appear to be inadequate in meeting future needs (TCP, 1972, p. 11).

Several inherent obstacles have traditionally blocked articulation efforts. Unquestionably, many problems interferring with successful articulation practices are purely economic in nature. Others may relate to institutional or agency autonomy or to problems in credit transfer from one level to another. The frequent lack of simplicity and consistency in policies from level to level also makes it difficult to plan and articulate contemporary education programs.

In a previous study, the Texas Education Agency has identified two specific domains of articulation: horizontal and vertical (TEA, 1975). Horizontal articulation refers to communication *within* a defined educational unit. For example, the various curriculum areas in the secondary school tend to be isolated from each other. Only in recent years have interdisciplinary programs been developed to span communication gaps and help ensure that students achieve both continuity in their progress and a more integrated view of relationships. It seems safe to assert that teachers of transportation programs may not know exactly if, or when, some of their colleagues are developing skills and competencies which directly bear on their own program development. Transportation, as a separate field of study, can be integrated with regular on-going programs where the mutual goals of multiple instruction could be synthesized.

Vertical articulation refers to communication *between* defined educational units at different levels. An obvious example is between the secondary school and the post-secondary school which may start students at entry points in programs that ignore prior training and experience of the student. If students are to move upward smoothly it seems reasonable to assert that educators at both levels need to be constantly aware of what skills and knowledge are developed, at both levels, to avoid wasteful duplicity. Educational programs exist to serve students in moving from where they are, educationally, to where they would like to be. A curriculum that ignores an individual's background and academic or career objectives is patently absurd and undeserving of students' and teachers' time and efforts.

THE TRANSPORTATION INDUSTRY: DEFINITIONS AND PROBLEMS

Transportation Definitions

Transportation in its most simple form is defined as a system that moves people and goods. It is a man-machine system that includes the physical conveyance, the power that moves it, and the way through or over which it moves (TCP, 1972, p.11).

It is not the task of this guide to go into depth with all of the implications of transportation for the world in which we live. This has been accomplished through countless volumes of material written about transportation since or perhaps even before man invented the wheel.

Transportation is generally divided into four basic modes: land, water, air, and pipeline. For purposes of comparison, the following will briefly explain each mode and the approximate percentage of the nation's business in transportation accomplished by each.

Land. Land transportation accounts for approximately 88% of the nation's commercial conveyance, in terms of dollars spent. Land transportation is further divided into sub-categories of highway and railway. Highway usage accounts for approximately 81% of the land transportation business while railways account for slightly over 6%.

Water. Inland and coastal waterways of America represent the oldest form of transportation now in use in the nation. Although eclipsed by the spectacular growth of land and air transportation, water transportation normally provides the lowest per unit cost of all transportation modes. The United States has over 28,000 miles of navigable rivers, canals, and harbors. When the Great Lakes are added to this figure there are over 126,000 navigable miles of waterways, excluding oceans, in or bordering the United States. The waterways are very significant in the movement of bulk products such as petroleum, chemicals, grain, coal and building materials. Water as a mode accounts for approximately 4% of the nation's transportation business.

Air. When, on December 17, 1903, the Wright Brothers first experienced powered flight above the earth's surface, few if any could anticipate the tremendous changes which would follow as a result of this new mode of transportation. The world has, in a sense, become both smaller and more accessible with each new generation of aircraft. Air transportation today accounts for approximately 7% of the nation's total transportation business. Air transportation is commonly divided into three categories: air carriers, military aviation, and general aviation. Many persons are aware of the commercial aspects of the air carrier industry which began as a result of the Air Mail (Kelly) Act of 1925. Most citizens, however, may not be aware that general aviation accounts for over 87% of the aircraft used in this nation. General aviation includes personal, business, commercial, instructional and special purpose flying. More than 30,000 companies in the United States own, or lease, and operate aircraft for business purposes. General aviation also accounts for about 91% of all licensed pilots, 79% of all civil aircraft hours flown and 50% of the passengers flown in intercity travel. General aviation uses all of the more than 12,000 airports in the nation. Air carriers account for approximately 2% of the aircraft flown in the nation.

Pipeline. Pipeline transportation is probably the least well known mode of transportation in operation today. The first evidence of pipeline transportation traces back to the transmission of natural heating gas through bamboo poles by the Chinese over two centuries ago. In 1970, the total volume of crude and refined oil products delivered out of pipelines engaged in interstate commerce represented about 22% of the total intercity freight ton-miles in the United States. Pipelines carry 40% of the nation's fuel energy. A boost in the understanding of pipelines and what they mean to our nation has come about recently through the development of the Alaskan Pipeline.

Pipelines are practically unaffected by weather, provide low cost transportation and generally are not as great a threat to our environment as other modes have sometimes been. Pipelines currently account for nearly 1% of our nation's business in transportation but through more modern techniques, coupled with automation and computerized controls our pipeline systems will likely become a significant and growing factor in the total transportation of goods.

The various modes of transportation provide for the transportation oriented student a multitude of career opportunities at practically every level of education and skill training. To be aware of the existence of each mode and the approximate percentage of the total transportation picture they represent is a good beginning place for career planning.

Problems Within The Transportation Industry

Use of the term industry coupled with transportation is perhaps misleading in that one may be inclined to think only about the manufacture of ships, planes, trucks, and pipelines. This, of course, is not accurate; the term involves the movement of goods and people. A better word than industry might be "system"; however, this is even less accurate since there is no transportation "system" as such in this nation. Recently, however, a national transportation policy statement was issued by the Secretary of Transportation which places into perspective the relationships among the various modes of transportation, state and federal governments and the federal-private sector (TSC, 1975). We are still left with a major problem, however, since there is no integrated, effective and efficient national transportation system as yet. Moreover, within the United States Congress there is not a single committee charged with developing legislation on transportation. Such matters are currently deliberated among at least four House committees (Coleman, 1975, p. 53).

In addition to the problem of having no unified transportation system, there seems to be other related items of concern. Duplication of effort or services appears to be a constant problem among social institutions, including government and business, and it involves most all facets of day to day operations. Transportation has no less a problem in this area than those already mentioned. Duplication of services among competing modes is maintained in the name of free enterprise and the healthy environment that competition fosters. This however, may be tolerated only as long as it is of positive worth and, because of related problems, one wonders if the law of diminishing returns may not have already set in.

A major problem related to this particular area is that of a fuel consumption crisis. Convincing the American people that an energy crisis is real, or certainly will become so, cannot be effectively accomplished if transportation itself is not willing to be the leader in this. Where one transportation mode can more efficiently and effectively provide movement of goods and services than another mode, some cooperation is of an absolute necessity to prevent wasteful duplication.

A problem related to an energy crisis is that of convincing Americans that a system of mass transportation can work, despite the problems in San Francisco, Washington, D.C., and New York City. Construction over-runs in the hundreds of millions of dollars, delays in scheduling, and safety will have to be overcome before the American taxpayer will accept a system of mass transit.

Finally, a major problem within most, if not all, transportation modes is to convince them that they are in the transportation business and not in the railroad, truck, or aviation business. Historians suggest that one of the major downfalls of the railroads as a major transportation mode was that they thought they were in the railroad business instead of the transportation business; therefore, they did not innovate until their backs were to the wall.

THE TRANSPORTATION CURRICULUM PROJECT

Intermodal transportation is defined as the movement of people or goods from one place to another using more than one mode of transportation. Usine this definition most trips can be classified as being intermodal. For instance, the trip to work in the morning — the walk to the car, drive to the station, train into the city, taxi to the office, walk to the desk. Or oil from the North Slope — pipeline from the well to an ice-free port, ship to a coastal port, pipeline or tank car to the refinery, tank truck to the service station.

An intermodal transportation career is defined as one containing job elements common to more than one mode of transportation. Thus, intermodal transportation skills are those which refer to occupational groups where job families can be identified and a ladder of progression or promotion is apparent, but where skills are not restricted to one mode or means of transportation. With minor modifications, these skills are common to several modes, are used by various carriers, and are present in the private and government sectors of the economy. For instance, knowledge and skills necessary for success in the job family called "Dispatcher" are concrete and it only takes different sets of minor modifications of these basic skills for the dispatching of airplanes, or boats, or taxis, or buses, or trains, etc.

These definitions, and the concept of Intermodal Transportation Career Education, have led to the identification of twelve major occupational groups and sixty-one job families within the Transportation Career Cluster. (For further amplification see TCP, 1972.)

Increased public demand for more and better transportation logically has resulted in an increased demand for workers with more and better training. Recognizing the need for school curricula directed toward preparing people for such career opportunities, the U. S. Office of Education has identified transportation as one of 15 career clusters meriting extensive curriculum development.

Under the auspices of the Ohio Department of Education, Division of Vocational Education, the Transportation Curriculum Project (TCP) has been developing nationally acceptable curriculum for orientation to, exploration of, and preparation for careers in transportation. The project has been responsible for (1) defining transportation occupations; (2) developing a framework for classification; and (3) developing curriculum materials consistent with the career education paradigm. As such, the TCP has become the major curriculum link between secondary

education and the transportation field. A basic premise of the TCP is that skills and knowledge are interchangeable from mode to mode; thus intermodality permeates the materials. The model out of which materials were produced included a career awareness phase, a career orientation phase, a career exploration phase, and a career preparation phase.

The TCP materials have been arranged so that students in the approximate grade range of six through eight would be given a basic orientation to the world of work and specifically to the world of transportation. The materials allow students to explore the importance of planning and to make tentative plans regarding occupations. For example, students will work with units which cover the opportunities for women in transportation, units which stress self-orientation to transportation careers and the education necessary, units which stress the need to plan for acquiring marketable skills and the ability to work with others, units which cover work values, the changing occupational scene, and units which cover selected technical aspects of transportation.

In the ninth and tenth grade levels, the TCP materials are keyed to a career exploration phase. At this level, students cover units which emphasize communication skills required in the world of work, how transportation contributes to society, changing employment, job operations, employment outlooks within specific occupations, skill requirements, job descriptions, career lattices, life styles, entry level requirements, and finally, units which re-emphasize the need for career plans. At this level, students interact with community resources in an effort to explore various transportation related skills and to build work role expectations.

Finally in the last phase, grades eleven through adult, TCP materials permit the learner to refine career decisions, to secure training such that job entry would be the logical culmination. When beginning career preparation, the student should narrow occupational specification by eliminating those alternatives which are less probable, unrealistic and hold little promise for personal fulfillment. This may require a variety of experiences that are; (1) designed to eliminate discrepancies between held beliefs and the reality of work in specified transportation occupations, and (2) necessary to vocational preparation for entry in the labor force. The student may actually try several work situations as an employee in the community with a participating employer under an approved cooperative education program arrangement with the school. For those whose realistic career plans specify an enroute arrangement, additional technical subjects which incorporate learning modules related to selected transportation occupations, and which are requisite to post-secondary training should be prescribed, scheduled, compelted and evaluated on an individual basis.

Of critical importance to teachers implementing any part of the Grade seven - twelve model is knowing exactly how the program and content relate to the rest of the program and to existing programs. Because the transportation cluster is broad, and because it reaches across other content areas and programs in the school, it usually must be infused, rather than transplanted as an entity unto itself. At least this is presently true because of the inertia of existing programs and the reluctance of school systems to change. For this reason, content and activities may be used both in separate transportation courses, labeled and taught within the broad-based transportation career cluster program recently implemented in the school, as well as in existing courses which deal with one aspect of the transportation cluster or another. It is also important that the teacher avoid frustration by remaining infinitely flexible, as both a program manager working with school staff and as a teacher working with students in the classroom, if implementation of the program is to be effective.

Teachers of transportation related programs present very little problem in accommodating the model program. Teachers in related programs and in other academic programs offer somewhat more of a challenge. They both should be solicited to use content and activities on a learning module basis to fit prescribed objectives for specific students. For example, the teacher in the driver education program should be approached to assist in teaching certain learning modules related to highway land transportation to students preparing for transportation occupations. As another example, the teacher-coordinator managing the cooperative education program option should teach transportation learning modules to students who are in training at service stations, trucking firms, airports and other establishments where transportation systems are significant to the operation of the business.

Teachers of academic subjects should be similarly involved with developing and implementing the transportation cluster program. While vocational education monies have supported the major expense for the development of career education programs to date under state and federal funding, it is becoming increasingly apparent that *all* teachers have an active role to play in the career education program (TCP, 1973).

Research into the various modes of transportation indicates a lack of information concerning transportation education programs at the secondary level in all modes except aviation. Much of the credit for information on aerospace-aviation programs at the secondary and post-secondary levels should go to the Aviation Education Programs Division of the Federal Aviation Administration for the leadership it has provided concerning educational programs in aviation and transportation (U.S. DoT, 1976). One can be optimistic that as other transportation modes develop more extensive programs, more information will be forthcoming.

OPPORTUNITIES FOR THE TRANSPORTATION STUDENT IN POST-SECONDARY EDUCATION

It is a difficult task to identify all post-secondary institutions offering transportation related educational programs. Invariably, some institutions will be forming or going out of business, others will be missed because of inaccurate reporting or data collection and for various other reasons. It is not the purpose of this guide to develop a directory of post-secondary institutions and programs but rather to provide a brief outline of the range of programs and degree levels available and to refer the reader to sources for directories of specific institutions.

Transportation Related Programs in Post-Secondary Institutions

Research concerning transportation related curricula within post-secondary institutions across the nation was conducted by the Federal Aviation Administration for the U. S. Department of Transportation during 1975 and a directory listing these institutions is now available. Table I which follows summarizes the findings of the research of transportation related curricula throughout the nation. The table does not include proprietary schools, correspondence schools, private trade and technical schools, nor regularly scheduled institutes, seminars and workshops (U.S. DoT, 1976).

Types of transportation related programs range from a short-term occupational program or single course all the way to a doctorate in aerospace science or transportation and safety education. Some 1035 institutions were identified in the survey. Over 3000 programs were identified from the research developed for the directory. As can be noted from Table I, the majority of programs are offered at the associate and baccaulaureate educational level followed very closely by masters degree programs. Understandably the majority of programs are intermodal in nature. Programs related to highways are second in number which is not surprising considering that highway transportation accounts for 81% of the nation's transportation business. What is surprising is that aviation programs follow highways so closely in third place.

Table II outlines regularly scheduled workshops, institutes, and seminars held within a vast array of educational institutions for the purpose of orienting, developing skills or providing general information for those persons needing such experiences. Some 283 institutions offer such short courses with a total of 362 transportation related seminars, workshops and institutes being held nationally.

The 1973-74 Directory of Post-Secondary Schools With Occupational Programs lists all accredited post-secondary schools (proprietary, public, home study, private) responding to the survey by the National Center for Education Statistics. While the index of programs is not

divided sufficiently into transportation modes for identification purposes, some assessment of such existing programs was made. Table III lists the various transportation related programs which could be identified, giving the area of vocational development and the number of programs within each area. The number of states offering programs was listed as well (Kay, 1975).

An updated directory will be available in July, 1976, and should provide the secondary counselor with another excellent source of transportation programs. The updated directory will have a further division which will list truck driver training schools separately. (The Directory will be available from the National Center for Education Statistics, Washington, DC) Information on occupational programs related to aviation show that those programs seem most readily identifiable.

Proprietary Schools

Proprietary schools vary considerably in relationship to their emphasis, length of programs and quality of programs. They may be primarily technical or trade related, resident or home study, or may be a combination of academic and skill development oriented. As with any educational program or institution, whether public or private, the potential student should investigate thoroughly the quality of the institution and its programs. Decisions should be based on merit and how well the program or institution fits the needs of the student.

Private Accredited Trade and Technical Schools. Information from the National Association of Trade and Technical Schools lists over 118 transportation related programs in some 78 institutions which are fully accredited by the Association (NATTS, 1975). It would be difficult, if not impossible, to determine how many similar institutions exist which offer transportation related programs but have not sought accreditation. Examples of such transportation programs offered and accredited are: airline personnel training, diesel and auto mechanics, pilot training, and training as an aviation maintenance technician. The above figures exclude trade and technical programs which offer training in skills used in transportation but which are difficult to assess as directly or exclusively related; such as instrumentation courses and electronics. A directory of all accredited programs and institutions is available from the Association.

Other Proprietary Schools. Published estimates in 1973 put the number of post-secondary institutions offering occupational programs at 11,731 (Wilms, 1973). Of these institutions, 15% were public and 85% private. 70%, or 8,279 institutions of the total were estimated to be proprietary schools. This is a staggering figure when one begins to assess the potential alternatives for teachers and counselors whose job it is to direct individuals from secondary education toward further preparation for life's work. How many of the more than 8,000 institutions offer transportation related programs is currently unknown and difficult, if not impossible, to determine.

TABLE I

TRANSPORTATION PROGRAMS IN POST-SECONDARY INSTITUTIONS
BY DEGREE LEVEL AND MODE

MODE	Occupational	Certificate	Associate	Bachelor	Masters	Doctorate	Total
Aviation	121	168	207	174	63	48	781
Highways	33	201	248	178	137	63	860
Intermodal	26	85	247	382	371	210	1321
Pipeline			5	11	10	9	35
Railway		1	3	2	5	2	13
Waterway	2	19	19	37	23	11	111
TOTAL	182	474	729	784	609	343	3121

TABLE II

REGULARLY SCHEDULED TRANSPORTATION WORKSHOPS, INSTITUTES, SEMINARS
BY MODE

Mode	Number of Institutions	Number of Programs
Aviation	156	177
Highways	70	113
Intermodal	49	64
Railway	1	1
Pipelines	1	1
Waterways	6	6
TOTAL	283	362

TABLE III

Post-Secondary Schools with Occupational Programs in Transportation*

Accredited Programs	Number of Institutions Offering Programs+	Number of States Offered In
Aeronautical Technologies[1]	166	37
Aircraft Ground Operations[2]	62	22
Aircraft Maintenance	180	38
Aircraft Operations	116	29
Automotive[3]	861	138
Commercial Pilot Training	1116	50
Transportation Services[4]	44	23
TOTALS	2545	N/A

* Directory of Postsecondary Schools With Occupational Programs, 1973-74, Evelyn R. Kay, National Center for Education Statistics, U. S. Government Printing Office, Washington, D.C., 1975.

+ Due to dual listings there will be duplication of some program numbers.

1 aircraft repair, technologies, aircraft operations, pilot training
2 traffic control, passenger service
3 auto body repair, auto mechanics, automotive services, automotive specialization repair
4 flight attendant, managers: bus, truck, airlines

Traditionally, many educators have not maintained a warm spot in their hearts for profit making schools, according to Tribett. Many seemingly feel that educational goals cannot be fostered within a profit making environment. Certain court cases and judgments by the Internal Revenue Service have supported this stand as recently as 1969 (Tribett, 1974).

More recently, however, through the efforts of many blue ribbon groups, such as the Commission on Non-Traditional Study and the Carnegie Commission, and especially due to the legal changes brought about by the Higher Education Amendments of 1972, there have been changes in attitudes toward the proprietary school. Certain such schools may now train students who have qualified for federal funds under the Student Assistance Program. Such schools also contract with the federal government to offer programs under the Special Programs for Students from Disadvantaged Backgrounds Act (Tribett, 1974). Many states also allow proprietary schools to offer specialized associate degrees.

The major points which seem to guarantee the success and continuation of proprietary schools are that: (1) they restrict themselves to a limited set of services which they normally perform with effectiveness and efficiency, (2) their programs are normally one-quarter to one-half as long as comparable programs in publicly supported institutions, which is very important to younger adults and to persons not employed because of lack of skills, (3) they are rooted in the job-market — if their graduates do not find job placement, word-of-mouth will reduce their enrollment — whereas public institutions are rooted in the political process of legislative appropriations and bond issues, and because of public support, are normally guaranteed continuation whether their students find jobs or not, (4) while tuition in normally more expensive to the recipient of the training, the total cost factor is about equal to public education, but the proprietary school must show a profit which requires greater efficiency and effectiveness on their part, and finally, (5) what little research has been accomplished on graduates of proprietary schools suggests that they fare as well, if not better, in the job market than graduates of public institutions. A study completed in 1972 found that the cost of education in proprietary schools was well worth the expenditure. The return on the investment was indexed at 29% meaning that the same amount of money would have to earn 29% annual interest in order for the lifetime benefits to equal the salary gained by additional training (Wolman, 1972). With the current emphasis on a college education, clearly there is a place for the proprietary school in our society.

Correspondence Schools

Correspondence study is available in practically any field one wishes to puruse. One may obtain correspondence courses in transportation related fields such as sirline management, auto mechanics and related fields such as electronics. Correspondence study is widely used by industry and professional groups.

The cost of correspondence study covers a wide range depending upon the nature of the subject, the materials furnished and the length of the course. The cost is usually less than residence instruction especially if one considers room, board and transportation. Most schools allow time payments and many accredited institutions enroll students assisted by the GI Bill, by industry, or through federally insured loans.

It is estimated that over 5 million persons annually in the United States are engaged in correspondence study. Since 1890, over 50 million Americans have studied through correspondence. The average student is 27 years of age and married.

Correspondence study had become so worldwide that in 1938, the International Council on Correspondence Education was organized and based in Victoria, British Columbia, Canada. This was done to increase the public's understanding of correspondence education, to promote and exchange ideas and to foster cooperation and fellowship among correspondence educators of all nations (Lockmiller, 1971).

Knowledge about correspondence schools is much like knowledge of proprietary schools in the sense of not knowing how many schools exist and how many offer transportation related programs. Still, the important feature is that additional education is made available to students needing skill and academic development. Although associations for correspondence study do exist, none responded to the inquiry for this study.

TRANSPORTATION DATA SOURCES

Assessments of the curriculum needs of teachers and counselors were made in conjunction with preparation of this guide. These studies indicate a desire to know what is available in the way of curriculum materials already produced. This knowledge would help them in doing any, or all of several things:

1. refer students to existing programs,
2. develop their own programs,
3. assess their programs in light of programs existing elsewhere in order to fill gaps or achieve consistency,
4. orient transportation-related programs and support areas to the transportation field, and
5. interface courses such as welding, electronics, and mechanics to a number of fields, of which transportation may be one.

In order to meet the above assessment, it was the purpose of the guide to explore the various curricular materials and career guides available, in addition to TCP materials, and insofar as possible, provide the user with some descriptive information. This information appears in the Appendix.

SUMMARY AND PROBLEM SOLUTIONS

This guide has attempted to put together ideas from articulation, post-secondary education, the transportation industry and from various other sources in order to make some sense of the problems confronting teachers, counselors and students interested in transportation careers. The success or failure of the attempt rests with the users of the guide as they attempt to construct or coordinate curricula, seek careers or establish communication among or within institutions offering transportation programs or careers. No individual can be an expert within all three major areas listed above. The information and problems are simply too vast. Certainly the busy teacher or counselor cannot hope to know these areas sufficiently to discharge their functions completely without reference to resources available. This is why we have selectively chosen the best information and sources available which we feel will aid the teacher, counselor and student in their endeavors to construct curricula, articulate within and beyond their institutions or seek a rewarding career in transportation.

It seems plausible to suggest that matters of career counseling, vocational and professional development and job placement within transportation would be greatly enhanced by an organization of interested businesses and individuals. This assemblage could serve as central point of contact for persons needing all kinds of transportation information, and could coordinate transportation-related educational and job placement programs. The degree to which articulation among institutions offering transportation education programs can be successful may also depend upon the establishment of communications among the various legislative committees charged with regulating such modes.

This is being done, to some extent, in some states. Success will require a tremendous effort by all representatives of business, industry and education wishing to cooperate. An organization in Nashville, Tennessee could serve as a national model for the type of cooperation and coordination needed in this effort. Tennesseans For Better Transportation is a non-profit organization of Tennessee Citizens concerned about, and working for, better transportation. The organization represents all areas of transportation. It is the first such organization in the nation to openly support and speak out for all of the various areas of transportation including education, and to offer every citizen an opportunity to become involved in helping bring about a more effective system of transportation statewide.

The model which guided the development of the TCP should also serve as a framework for guiding the progress of individual students who are interested in transportation careers through the educational system. It is reasonable, for example, to suggest that post-secondary educational units should become concerned with developing opportunities in the career exploration phase by putting students into direct contact with available resources to further refine pre-job entry skills and career decisions. Programs that do not operate at this phase risk duplication

of work which students may previously have completed in secondary institutions. If the students, rather than program maintainence, are to indeed be the central focus of concern, some efforts are needed to ensure that they do not reach grade twelve and beyond before encountering programs that emphasize career awareness or exploration.

In conclusion, it seems necessary that *both* secondary and post-secondary institutions cooperate with the transportation industry, in some kind of formal organization, to solve the problems of articulation. While certainly not exhaustive, the following list suggests some beginning solutions which all involved people and institutions could pursue:

A. Seek definitive, follow-up student data on problems of movement from one level to another in transportation education.

B. Begin to build programs, with evaluation based upon objectives, to help assess both beginning and ending points of students.

C. Supplement existing courses with TCP materials. The TCP preparation materials are designed to be supplementary to in-school job training programs. Students may individually study the transportation career preparation phase as related materials or the program guide may be used with an entire class. Students may also do intensive study in one of the transportation occupational groups in conjunction with supervised correspondence study or with released time to obtain specific job skills.

D. Where there are not sufficient numbers of students, it is possible to offer TCP programs to students by offering a completely individualized study plan by working with guidance counselors and community representatives or by combining students from other career clusters into one class. A third option would be to offer programs on an alternate semester basis to build sufficient numbers of students.

E. Develop entirely new courses based on TCP materials.

F. Include units of the TCP in libraries and learning resources centers.

G. Provide for individual instructor exchanges within and between secondary and post-secondary programs.

H. Have post-secondary institutions analyze their programs within the career education conceptual framework and compare them with secondary programs.

I. Build curriculum resources and stock technical libraries consistent with the TCP model.

J. Combine appropriate facilities for seminars and workshops to begin dialogue on curriculum consistency and problems.

K. Seek specific articulation policies and agreements among appropriate educational units.

L. After initial conferences, and dialogue, formulate curriculum articulation groups to move toward definitive solutions for students.

M. Develop compatible record-keeping systems to help document student progress through various competency level.

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APPENDIX

In addition to The Transportation Curriculum Project materials, the following are additional sources of materials.

1. Aerospace Education Curriculum Guide (K-12), Oklahoma Aerospace Education Committee and Curriculum Improvement Commission, Oklahoma State Department of Education, 1971, 96 p., from Oklahoma State Department of Education.

   Summary: Contains suggested aerospace activities by subject area for elementary and secondary schools, history of aviation and an aviation glossary. Also, lists limited bibliography of general references and course resource materials and organizations which supply such materials. Suggest some excellent activities for the classroom teacher who wishes to integrate aerospace into various subject fields.

2. Aerospace Education Directory, National Aeronautics Association, Volume II, Number 1, 63 p., from NAA, 610 Shoreham Bldg., 806 15th Street, N.W., Washington, D.C., 20005, $1.00.

   Summary: An annual publication which includes the only complete guide to sources of materials and assistance in aerospace education. Includes addresses, services and materials of associations, manufacturers, government agencies, publishers and a complete index to the previous year's Journal of Aerospace Education. Sent to all new subscribers of the Journal. This is an indispensible directory for persons developing courses, programs or offering workshops related to aviation-aerospace.

3. Aerospace: World of Work, Utah State Department of Public Instruction, 136 East South Temple, Salt Lake City, Utah, 126 p.

   Summary: A very thorough aerospace curriculum guide for the elementary level giving objectives, activities, resource materials, films and student worksheets. Also provides career descriptions of various job classifications in aviation/aerospace. Excellent source for the elementary classroom teacher.

4. Airline Flight Attendant Career Guide, Michael A. Schukert, Federal Aviation Administration, 1973, 48 p.

   Summary: An excellent guide for exploring and defining a career as a flight attendant. Gives history, nature of the work, employment outlook and general hiring criteria. The majority of the guide consists of specific information from 26 airlines in relation to hiring, pay, benefits, etc. Lists colleges offering associate degree in flight service programs.

5. An Urban Transportation Bibliography, available only from United States Department of Trans Urban Mass Transportation Administration, Washington, D.C., National Technical Information Services, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia, 22151, May, 1971, 106 p.

   Summary: Includes abstracts of reports, studies, articles, monographs, etc. on urban transportation. Subject-author indexed. Summary of each report listed.

6. Aviation Career Awareness Program, Cessna Aircraft Company, Wichita, Kansas, 67201, 1975, $4.95.

   Summary: Several educational programs designed to create a better understanding of air transportation including elementary, secondary and college level materials plus a Programmed Assistance to Vocation Education (PAVE) for use in technical training.

7. Aviation Education Teacher's Guide for SST..T..T, from Federal Aviation Administration, Washington, D.C., 73 p.

   Summary: An elementary teaching guide integrating environment communication, math-science, and economics through aerospace. Provides source cards, activities, glossary and bibliography of resources and agencies.

8. Careers in Aerospace, American Institute of Aeronautics and Astronautics from the Institute, 1290 Avenue of America, New York, 10019, 12 p.

   Summary: Designed to aid the student in choosing an area of interact in aerospace science and technologies and to show how one may prepare for these fields. Lists engineering colleges in the United States.

9. Career Information Handbook, Texas State Technical Institute and Texas Education Agency, Waco, Texas, July, 1973, ERIC ED 085504, 291 p.

   Summary: Divided into the 15 career clusters identified by the United States Office of Education each division includes a general statement concerning the cluster of careers, a comprehensive but brief summary of several career fields within the cluster including bibliography and a dictionary of numerous other careers within the cluster. Contains selected general bibliography covering many careers. Written in very simple style with little depth, appropriate for student exploring careers.

10. Directory of National Association of Trade and Technical Schools, 1975-76, 105 p., from the Association, 2021 L Street, N.W., Washington, D.C., 20036.

Summary: Lists member institutions by state and lists programs by institution. Contains numerous transportation related programs nationally as well as other trade and technical programs not related to transportation. An excellent guide for those seeking accredited trade and technical programs.

11. Directory of Transportation Education, The Education Commission, Research and Education Council of National Defense Transportation Association, 1972, 37 p., from the Association, 1612 K Street, N.W., Washington, D.C., 20006.

    Summary: Provides transportation education degree programs and courses offered by two-year and four-year colleges and universities with alphabetical listing by states. An excellent guide for students seeking courses and programs in transportation at the college level.

12. Exploring Careers in Transportation: A Guide for Teachers. Herbert Martin, Curriculum Development Center for Vocational Education, University of Kentucky, Lexington, Ky., July 1974, ED 098-418, 242 p.

    Summary: One of the eleven guides for junior high school career exploration. Contains information on land, water, air, space and conveyance modes. Appendix lists addresses, publishers and organizations related to transportation.

13. 1975 Status Report and Resource Guide on Aviation and Space Related High School Courses, General Aviation Manufacturers Association, Suite 1215, 1025 Connecticut Avenue, N.W., Washington, D.C., 20036, 27 p.

    Summary: Primarily a statistical study indicating aerospace teacher qualifications, the number of high school programs available, kinds of activities and course content of such programs. Includes directory of 125 aviation education resource centers, state advisory committee, teacher associations, and state directors of the National Aerospace Education Association. Useful to the teacher desiring statistical support for proposing a high school aerospace course.

14. 1976 Membership Directory, Institute of Transportation Engineers, Arlington, Virginia, 1976, 256 p.

    Summary: In addition to list of members, contains Institute's purposes, standards, practices and policies. Also includes recommendations on transportation development, urban transportation, worldwide standards, etc. of limited benefit except to counselors planning career programs or as resource material for aspiring engineers.

15. Sources of Information in Transportation, Ad Hoc Committee of Librarians, Marianne Yates, Chairman, The Northwestern University Press, Evanston, Illinois, Transportation Center at Northwestern University, 1964, 262 p.

Summary: Provides extensive annotated bibliography of the principle sources of information in several fields of transportation; highways, motor carriers, metropolitan transportation, railroads, pipelines, merchant marine, inland waterways, air transportation, missles and rockets and general sources. An indispensible source for those constructing transportation curricula or desiring additional transportation information to supplement existing curricula. Lists principle transportation organizations and professional societies. Each section divided into statistics, finance, legal and regulatory information, world wide sources, history and specifics unique to each mode.

16. Transport Career Opportunities, Education Committee, National Defense Transportation Association, Washington, D.C., June, 1974, 75 p., $5.00.

Summary: Gives information on various careers available in transportation by mode as well as salary range by job description. Also provides sources of additional information on education and job opportunities by mode.

17. Transportation Career Opportunities, Delta Nu Alpha Transportation Fraternity, Cleveland, Ohio, 20 p.

Summary: An interest building monograph giving a cursory overview of career opportunities within the principal modes of transportation. Lists limited sources of additional information by mode as well as some specific institutions offering educational programs in transportation.

18. Transportation: Occupational Cluster Series-15. David H. Miller, Allen B. Moore, Center for Vocational And Technical Education, The Ohio State University, Columbus, Ohio, 43210, 1973, 67 p.

Summary: Abstracts of selections from three major sources on vocational and technical education in relationship to transportation careers. Abstracts include pilot projects, teaching guides, free filmstrips, annotated bibliographies, design, construction and other transportation related subjects. Particularly reflective of ground transportation.

19. Transportation System Technology - A Twenty Year Outlook, Transportation System Center available from National Technical Information Services, 5285 Port Royal Road, Springfield, Virginia, 22151, August, 1971, 173 p.

Summary: Document findings of a technology survey made of various new transportation systems and forecasts possible future developments of same. Written in generally non-technical form. Divided into urban passenger transportation, inter-urban good movement and inter-urban passenger haul. Illustrated. Contains bibliographies for each section.